CLAIMS

1. A device for in vivo imaging comprising at least one CMOS imaging camera, at least one illumination source for illuminating a site in vivo, an optical system for imaging the site in vivo onto the CMOS imaging camera and a transmitter for transmitting video output of the CMOS imaging camera.

2. The device according to claim 1 wherein the CMOS imaging camera comprises active pixel circuitry.

3. The device according to claim 2 wherein the CMOS imaging camera comprises a correlated double sampler for processing an analog signal produced by the active pixel circuitry.

4. The device according to claim 1 wherein the CMOS imaging camera comprises an analog to digital converter having serial output.

5. The device according to claim 1 wherein the CMOS imaging camera comprises an encoding and randomizing unit for defining frame and row parameters and for priming digital signals for transmission.

6. The device according to claim 1 wherein the CMOS imaging camera comprises

active pixel circuitry, said circuitry producing an analog signal;

a correlated double sampler for processing the analog signal produced by the active pixel circuitry;

an analog to digital converter having serial output for converting the analog signal to a digital signal; and

an encoding and randomizing unit for defining frame and row parameters and for priming the digital signal for transmission.

7. The device according to claim 1 wherein the CMOS imaging camera is an ultra low powered camera and has reduced sensitivity to light in the red spectrum.

8. The device according to claim 1 wherein the illumination source is a white LED.

9. The device according to claim 1 wherein the illumination source comprises a refracting crystal matrix having at least one blue LED chip integrated therein.

10. The device according to claim 1 wherein the optical system comprises an aspherical focussing lens.

11. The device according to claim 10 wherein the optical system further comprises at least one collimator for collecting remittent light.

12. The device according to claim 1 wherein the transmitter comprises an internal electronic switch for converting a logic of a normally open switch to a normally closed logic.

13. The device according to claim 1 wherein the transmitter comprises a control block for controlling the CMOS imaging camera.

14. The device according to claim 13 wherein the control block further controls the illumination source.

15. A swallowable capsule for in vivo imaging of the gastrointestinal tract, said capsule having an optical window and comprising

at least one CMOS imaging camera;

at least one illumination source for illuminating a gastrointestinal tract site;

an optical system for imaging the gastrointestinal tract site onto the CMOS imaging camera; and

a transmitter for transmitting video output of the CMOS imaging camera.

16. The swallowable capsule according to claim 15 wherein the CMOS imaging camera comprises active pixel circuitry.

17. The swallowable capsule according to claim 16 wherein the CMOS imaging camera comprises a correlated double sampler for processing an analog signal produced by the active pixel circuitry.

18. The swallowable capsule according to claim 15 wherein the CMOS imaging camera comprises an analog to digital converter having serial output.

19. The swallowable capsule according to claim 15 wherein the CMOS imaging camera comprises an encoding and randomizing unit for defining frame and row parameters and for priming digital signals for transmission.

20.The swallowable capsule according to claim 15 wherein the CMOS imaging camera comprises

active pixel circuitry, said circuitry producing an analog signal;

a correlated double sampler for processing the analog signal produced by the active pixel circuitry;

an analog to digital converter having serial output for converting the analog signal to a digital signal; and

an encoding and randomizing unit for defining frame and row parameters and for priming the digital signal for transmission.

21.The swallowable capsule according to claim 15 wherein the illumination source is a white LED.

22.The swallowable capsule according to claim 15 wherein the illumination source comprises a refracting crystal matrix having at least one blue LED chip integrated therein.

23.The swallowable capsule according to claim 15 wherein the optical system comprises an aspherical focussing lens.

24.The swallowable capsule according to claim 23 wherein the optical system further comprises at least one collimator for collecting remittent light.

25.The swallowable capsule according to claim 15 wherein the transmitter comprises an internal electronic switch for converting a logic of a normally open switch to a normally closed logic.

26.The swallowable capsule according to claim 15 wherein the transmitter comprises a control block for controlling the CMOS imaging camera.

27.The swallowable capsule according to claim 26 wherein the control block further controls the illumination source.

28.The swallowable capsule according to claim 27 wherein the control block sends a shutdown signal to the imager to inactivate it and to the transmitter itself to inactivate main capsule subsystems.

29.The swallowable capsule according to claim 28 wherein the control block sends a shutdown signal for a two hour period following activation of the transmitter.

30.The swallowable capsule according to claim 15 wherein the transmitter transmits on radio frequency.

31.A system for in vivo imaging comprising

an imaging system for capturing images in vivo and for producing video output;

a transmitter for transmitting the video output; and

a receiving system for receiving the transmitted video output, said imaging system comprising at least one CMOS imaging camera, at least one illumination source for illuminating a site in vivo and an optical system for imaging the site in vivo onto the CMOS imaging camera.

32.The system according to claim 31 further comprising an antenna array capable of surrounding a body and comprising at least one antenna for receiving the transmitted video output and for producing a plurality of received signals.

33.The system according to claim 32 further comprising a demodulator capable of transforming the plurality of received video signals into a single video datastream.

34.The system according to claim 33 further comprising a data processing system which generates tracking and video data from the single datastream.

35.The system according to claim 34 wherein the receiving system and data processing system are located outside a patient.

36.In a device for in vivo imaging, said device comprising at least one CMOS imaging camera, at least one illumination source for illuminating a site in vivo and an optical system for imaging the site in vivo onto the CMOS imaging camera,

a transmitter for transmitting signals from the CMOS imaging camera to a receiving system, said transmitter comprising a control block for controlling the CMOS imaging camera.

37.The transmitter according to claim 36 wherein the control block further controls the illumination source.

38. The transmitter according to claim 36 comprising an internal electronic switch for converting a logic of a normally open switch to a normally closed logic.

39. The transmitter according to claim 36 wherein the control block sends a shutdown signal to the imager to inactivate it and to the transmitter itself to inactivate main device subsystems.

40. The transmitter according to claim 39 wherein the transmitter sends beacon signals.

41. The transmitter according to claim 36, said transmitter transmitting on radio frequency.

42. In a system for in vivo imaging, said system comprising an imaging system for capturing images in vivo and for producing video output and a receiving system for receiving the transmitted video output, said imaging system comprising at least one CMOS imaging camera, at least one illumination source for illuminating a site in vivo and an optical system for imaging the site in vivo onto the CMOS imaging camera,

a transmitter for transmitting signals from the CMOS imaging camera to the receiving system, said transmitter comprising a control block for controlling the CMOS imaging camera.

43. The transmitter according to claim 42 wherein the control block further controls the illumination source.

44. The transmitter according to claim 42 comprising an internal electronic switch for converting a logic of a normally open switch to a normally closed logic.

45. The transmitter according to claim 42 wherein the control block sends a shutdown signal to the imager to inactivate it and to the transmitter itself to inactivate main device subsystems.

46. The transmitter according to claim 45 wherein the transmitter sends beacon signals.

47. The transmitter according to claim 42, said transmitter transmitting on radio frequency.

48. In a device for in vivo imaging, said device comprising at least one image sensor, an optical system for imaging a site in vivo onto the image sensor and a transmitter for transmitting signals from the image sensor to a receiving system,

an illumination source for illuminating the site in vivo, said illumination source comprising at least one blue LED chip and a refracting crystal.

49. The illumination source according to claim 48 wherein the at least one blue LED chip is integrated within a refracting crystal matrix.

50. A method for imaging an in vivo site comprising the steps of

illuminating a site in vivo;

collecting remitted light onto pixels of a CMOS imaging camera, thereby generating an analog signal;

processing and converting the analog signal to a digital signal;

randomizing the digital signal;

transmitting the digital signal to a receiving system; and

processing the transmitted signals to obtain images of the in vivo site.

51. The method according to claim 50 wherein the step of illuminating is done by utilizing a white led.

52. The method according to claim 50 wherein the wherein the CMOS imaging camera comprises

active pixel circuitry, said circuitry producing an analog signal;

a correlated double sampler for processing the analog signal produced by the active pixel circuitry;

an analog to digital converter having serial output for converting the analog signal to a digital signal; and

an encoding and randomizing unit for defining frame and row parameters and for priming the digital signal for transmission.

53. The method according to claim 50 wherein the step of processing and converting the analog signal to a digital signal is preformed by an analog to digital converter having serial output.

54. The method according to claim 50 wherein the step of randomizing the digital signal is performed by randomizing occurrences of 0 and 1 digital signals.

55. The method according to claim 50 wherein the step of transmitting the digital signal to a receiving system is preformed by a transmitter, said transmitter comprising a control block for controlling a CMOS imaging camera.